

Artificial wetland, a key role in the regeneration of waste water and environmental recovery

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Photo credit: Lluís Sala

The use of wetlands in water purification combines the award of a safe water for environmental uses, with the protection and recovery of the natural environment and biodiversity.

Waterharmonica is a concept that in Holland, where it emerged, came to mean "water accordion." Designates the transition zone between the point of discharge, treatment facilities of wastewater and the environment, as indicated by Lluís Sala, a biologist with the Consortium of the Costa Brava and expert in water purification and recovery after the presentation offered within Smallwater.

Smallwater The Third International Congress 2011, held in Seville from 25 to April 28, gave diffusion through the more than 400 participants from 50 countries, the latest scientific advances in treatment and wastewater management and sanitation small populations. In this context, the scientist Lluís Sala speaks of the experience developed by the Consortium of the Costa Brava in relation to the concept of Waterharmonica.

In this sense, states that by 1995, with the construction of the WWTP (wastewater treatment plant) "in macrourbanización Empuriabrava (Castelló d'Empúries), then director of the Parc Natural de l'Empordà Aiguamolls, Jordi Sargatal, asked to take the treated water for environmental uses artificial lake in El Cortalet next to the park visitor center. To perform such use, had first to reduce the nitrogen content of treated water to avoid problems of eutrophication in the point of use, so that the solution to build a surface flow wetland for the refinement of water quality, was the most logical, even at the landscape and integration into the environment. Moreover, the very Jordi Sargatal suggested that, with the effluent of the three cells of the wetlands, make a shallow lagoon right next to them, nowadays called Estany Europe, to increase the attraction of birds and it was a place where there were booths open to public observation.

Unknowingly, we had laid the basis for developing a system that someone in the Netherlands, Ruud Kampf and Theo Claassen, was named as Waterharmonica. "

Thus, in different places, the Netherlands and Spain, and to similar challenges, the purification of waste water, different researchers have come to propose similar solutions. However, as noted by Lluís Sala, "The differentiating factor of the proposed installation is that also seeks to maximize the environmental benefits of food webs that appear in the system itself, reinforcing the biological richness of the area."

The idea implicit in the concept Waterharmonica is a system based on ecological engineering, the use of artificial wetlands for wastewater treatment. And it is a link between the basic treatment given to sewage and safe discharge over a water surface. It gets so these wastewater treatment plants treated in conventional first and then refined the model Waterharmonica, are likely to be reused, for example, in agriculture and aquaculture.

The novelty of the approach is implemented by applying the concept of Waterharmónica is, like himself explains biologist Consortium Costa Brava, "Until now, most wetland systems were treated only as a treatment facility water, while the natural was a side benefit, when they occurred. The proposed Waterharmonica comes to tell us that there is a potential biological also maximize if taken several decisions to encourage it. This does not mean that these facilities are idyllic or is exempt from trouble, but they can provide greater environmental benefits than the strictly linked to water treatment. "

The use of artificial wetlands or constructed for the treatment of wastewater is not new, has been using for some time. It is natural purification systems that respect the environment and the environment and also require less energy resources in its operation.

Biologist consortium Costa Brava, Lluís Sala said the benefits: "The wetlands are very suitable for refining the quality of treated water, provided there is adequate conditions for drivers (land availability, low cost same, etc.).. If well designed and operated, allow to reach high levels of quality, eg total inorganic nitrogen, which would be complicated mechanized installations to achieve. "

However, this does not mean that it is a perfect system and, since it has some drawbacks that researchers continue to work, nor be the only or most appropriate times and in all cases and situations. In this regard, Lluís Sala concrete "since we have almost no chance of controlling the plant when water comes in it, must provide an effluent quality that can process the wetland itself. Based on our experience, we can say that the surface flow wetlands work well with fully nitrified secondary effluent (or almost), ie very low concentrations of nitrogen. " He adds: "Another aspect to consider and it is not easy to control is the total phosphorus, and in certain periods can be a major release of it from the sediment of the wetland, despite applying a chemical effluent disposal phosphorus. This is surely the next challenge in the exploitation of such systems. "

Therefore, we should not think about having to choose between a conventional treatment of wastewater in conventional treatment plants, and natural cleansing system such as that used for this system of artificial wetlands. But rather to integrate them, so that, as explained by the biologist, is used "hard technologies to make a good and efficient purification of wastewater, more soft technologies to achieve a high quality refinement in terms of nitrogen" .

One of the cornerstones of this water reclamation system, based on constructed wetlands is their sustainable energy. These facilities themselves pose no energy cost, and to use the resources offered by the same natural environment to purge contaminants from water. Require, of course, a certain energy input, as it should be noted, however, Lluís Sala explains that "in order to function

properly these facilities have to apply a nitrified effluent, which leads to some increase in consumption energy in the sewage. " However, the researcher would observe that it is "an energy well spent, as it is to purify and regenerate clean water that can be returned to nature with no impact."

This leads us to ask whether this technology, ecological and environmentally friendly, could be implemented and implemented anywhere. And in this respect, closely associated with the issue of financial sustainability, note that the higher cost of a system of this kind, found primarily in the areas necessary for their implementation.

That is, this is not a technology that can solve, always and everywhere, the problems of purification and regeneration of water. As the expert says, is one of the options that we can apply today to the treatment of wastewater and to restore water quality and thus be able to give a further environmental advantage.

In this sense, the technology applied by the Consortium of the Costa Brava, offers the availability of reclaimed water of adequate quality in areas like the Mediterranean, prone to suffer from periodic droughts. And can also leverage the strategic value of the wetland ecosystem itself has an excellent natural remedy for the protection and conservation of the environment and biodiversity.

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